which divides the pole into upper and lower segments equal to $(l/2)(2 - \sqrt{2})$ and $(l/2)\sqrt{2}$ respectively, the pole then forming an isosceles triangle with the axes.

Excellent solutions were received from FRANK IRWIN, J. A. CAPARO, H. C. FEEMSTER, and N. P. PANDYA.

CALCULUS.

384. Proposed by JOSEPH B. REYNOLDS, Lehigh University.

In what time will a sum of money double itself at 6 per cent. interest per annum if compounded at indefinitely short intervals?

SOLUTION BY H. L. AGARD, Williams College.

If the interest is compounded k times a year, the amount after n years is given by the formula

$$A = P\left(1 + \frac{r}{k}\right)^{nk}.$$

When the interest is compounded at indefinitely short intervals,

$$A = \lim_{k=\infty} P\left(1 + \frac{r}{k}\right)^{nk} = \lim_{k=\infty} \left[P\left(1 + \frac{r}{k}\right)^{k/r}\right]^{nr} = Pe^{nr}. \tag{1}$$

In (1), setting $A = 2P$, $r = .06$ and solving for n, we have

$$n = \frac{\log_e 2}{.06} = \frac{.69315}{.06} = 11.5525 \text{ years.}$$

Also solved by H. C. FEEMSTER, W. W. BURTON, G. W. HARTWELL, C. E. FLANAGAN, J. W. CLAWSON, FRANK R. MORRIS, H. S. UHLER, ELIZABETH OVIN, F. FORDERO (Seville, Spain), and and HERBERT N. CARLETON.

386. Proposed by HERBERT N. CARLETON, West Newbury, Mass.

C is a fixed point on the perpendicular bisector of a line segment AB. Locate a point D also on this bisector, such that $AD + BD + DC$ shall be a minimum.

SOLUTION BY H. C. FEEMSTER, York College, Nebraska.

Let the foot of the perpendicular be E, $CE = b$, $AE = EB = a$, and $DE = x$. Then $AD + BD + DC = 2\sqrt{a^2 + x^2} + b - x$, which is to be a minimum. Taking the derivative of this expression, setting it equal to 0, and solving for x, we have

$$x = \frac{a\sqrt{3}}{3} = DE, \text{ as required.}$$

MECHANICS.

301. Proposed by CLIFFORD N. MILLS, Brookings, S. Dak.

A wire is hanging from two points in the same horizontal plane. If the difference between the length of the wire and the actual distance between the supports is very small, show that

$$s = x\left(1 + \frac{x^2}{6c^2}\right),$$

where s is one half of the length of the wire, c is the tension at the lowest point divided by w the load per unit of horizontal distance, and x is the distance of the lowest point of the curve to the point of support.